Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Frequency dependent subharmonic threshold for contrast microbubbles[1] AMIT KATIYAR, KAUSIK SARKAR, University of Delaware — We numerically investigate the predictions from several contrast microbubble models to determine the excitation threshold for subharmonic generation. All models are transformed into a common interfacial rheological form, where encapsulation is represented by two radius dependent surface properties—effective surface tension and surface dilatational viscosity. In contrast to the classical perturbative result, the minimum threshold for subharmonic generation is not always obtained near twice the resonance frequency; instead it can occur over a range of frequency from resonance to twice the resonance frequency. The quantitative variation of the threshold with frequency depends on the model, bubble radius and encapsulation properties. Some models incorporate an upper limit on effective surface tension (resulting from strain softening or rupture of the encapsulation during expansion). Without this upper limit, the threshold is extremely large especially near the resonance frequency and there is a global minimum near twice the resonance frequency. On the other hand, having zero surface tension in the buckled state (the lower limit) increases the threshold especially near twice the resonance frequency which in presence of the upper limit results in a possible shift of the minimum threshold towards resonance.

[1]Partially supported by NSF and NIH.

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Date submitted: 02 Aug 2011 Electronic form version 1.4